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Author(s): Anaya, Lillian Marie  
Adkins, Kenneth Brian

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# Operational and Mission Highlights

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A MONTHLY SUMMARY OF TOP ACHIEVEMENTS

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**May 2021**

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## Discovery of New Material Could Someday Aid in Nuclear Nonproliferation

A newly discovered quasicrystal created by the first nuclear explosion at the Trinity Site, N.M., on July 16, 1945, could someday help scientists better understand illicit nuclear explosions and curb nuclear proliferation.

"Understanding other countries' nuclear weapons requires that we have a clear understanding of their nuclear testing programs," said Terry C. Wallace, director emeritus of the Laboratory and co-author of the paper about the discovery, which was published June 1, 2021, in *PNAS*. "We typically analyze radioactive debris and gases to understand how the weapons were built or what materials they contained, but those signatures decay. A quasicrystal that is formed at the site of a nuclear blast can potentially tell us new types of information — and they'll exist forever." (See video [here](#).)

The newly discovered material was formed accidentally in the blast of the first atomic bomb test, which resulted in the fusion of surrounding sand, the test tower, and copper transmission lines into a glassy material known as trinitite. Quasicrystals are exotic material that break the rules of classical crystalline materials. Materials such as sugar, salt, or quartz form crystals with what is known as a periodic order: the atoms are arranged in a pattern that repeats itself in three dimensions. First discovered in the 1980s, quasicrystals have an atomic structure of the constituent elements, but the pattern is not periodic. The quasicrystal, created by the Trinity explosion in a sample of red trinitite, has 5-fold rotational symmetry, which is not possible in a natural crystal.

## First Series Completed of New Dynamic Compression Experiments on the Sandia National Laboratories' Z-Machine for Plutonium Aging

These experiments support an evaluation of the compressibility of new and aged plutonium along weapons-relevant trajectories. The joint team from Los Alamos and Sandia National Laboratories was able to use results from the first experiment to modify the drive conditions to enable improved data quality for the sec-

ond experiment. Results from these experiments are being analyzed at both laboratories.

## Laboratory Completes Investigation of the Ignition Behavior of High Explosives DAAF and HMX

The explosive 3,3'-diamino-4,4'-azoxyfurazan (DAAF) is a fairly insensitive explosive with potential stockpile applications. However, recent drop-weight impact tests indicate DAAF reacts at lower drop heights than expected. New subshock impact (crush gun) data suggest the following: even though ignition sites are present at low-impact projectile speeds, they do not propagate through the material on the timescale of the test. Scientists have also tested impact sensitivity and observed ignition behavior for multiple batches of the explosive HMX, where full propagation is observed with the crush gun tests.

## Laboratory's Cross-Platform Aging Investigation of Recently Manufactured Plutonium Offers New Opportunities to Validate Competing Theories

Isothermal dilatometry techniques have continuously measured the change in length of a delta-plutonium sample — now approximately one year old — under ambient conditions for more than 140 days. Results indicate the bulk density of plutonium increases with age, with a reduction in the rate of change of density with time.

Findings suggests the impact of radiological decay on bulk density of plutonium is greater at early ages than at more advanced ages. However, this trend is in contrast to X-ray diffraction measurements that show a global increase in the lattice parameter with time over the first year, indicating a reduction in density.

More experimental work is needed to understand this seeming discrepancy, for the aging change of plutonium is of importance. These contrasting measurements, on nominally similar delta-plutonium, offer new opportunities to validate competing theories on the dominant structures that evolve during aging. Results from the Laboratory's broader Cross-Platform Aging Study will be used to validate atomistic modeling approaches

to enable a more predictive understanding of plutonium aging.

## Nuclear Material Inventory in May 2021 Ensures Safe Operations

On April 28, 2021, workers in the Laboratory's Plutonium Facility (PF-4) at TA-55 started Nuclear Material Accountability and Control (NMC&A) inventory. Scheduled for completion on Friday, May 21 are nine out of ten Material Balance Areas, which were released to resume production activities on the morning of May 24. Completion of the inventory was accomplished in 14 workdays, a week and a half ahead of schedule. NMC&A inventory is a regular process that ensures all hazardous materials are accounted for at the appropriate levels and locations. PF-4 operations depend on successful and timely inventories to ensure the safety of materials and employees during work, as well as to ensure future use of the necessary materials. NMC&A inventories take significant preparation because operations must pause during the inventory, which supports many PF-4 operations staying on schedule.

## Physicists, Engineers, and Waste Specialists Collaborate to Resume Operations for Critical Resources

On March 24, 2021, a pyrophoric event that resulted from removing waste from an inert glovebox paused all waste operations at the Laboratory's Plutonium Facility (PF-4), including the gas gun at TA-55. A team consisting of staff members from multiple Laboratory groups and divisions worked collectively to analyze all materials used for gas-gun operations to detect potential oxidation, reaction, and pyrophoricity. The team presented its findings to a review committee, which resulted in the release of the hold on waste operations for the gun during first week of May 2021. Return of the gun to operational status enables personnel to conduct critical experiments that support multiple milestones in the areas of certification, advanced manufacturing, and advanced diagnostics.

## Predicting Strength Changes in Metals Caused by Irradiation-Formed Helium Bubbles

Nithin Mathew of Physics and Chemistry of Materials (T-1), along with other Laboratory researchers, recently conducted one million critical-processing-unit hours

of calculations to build a database of the effect helium bubbles have on characteristics of the strength governed by dislocation mobility. Helium bubbles are caused by irradiation and can occur during the natural aging of radioactive materials (such as plutonium). Bubbles also form when materials are placed in the presence of radioactive materials.

The data from this research will be used to parameterize a physics-based model representing the change of strength associated with the evolution of lattice defects caused by aging under important loading conditions inaccessible by conventional experiments.

### SCIENCE, TECHNOLOGY, AND ENGINEERING

## Advanced Simulation and Computing's Material Point Method Provides Accurate Predictions of Fragmentation in Explosions

There are many scenarios where the behavior of fragment fields is of interest, such as the characterization of conventional munitions and safety in complex accidents. In Volume-of-Fluid (VOF) Eulerian codes, such as PAGOSA or xRAGE, scientists do not predict the separation of damaged material in a physically accurate way, instead often relying on the over-characterization of material stretching.

In Lagrangian codes, difficulties arise when meshed bodies are required to break up into smaller bodies. Representing a fragmenting body using the Material Point Method (MPM) enables researchers to manage such difficulties. PAGOSA's FLuid Implicit Particle — MPM (FLIP+MPM) — enables mixed-frame simulations, where an arbitrary number of materials in a simulation may be represented using the MPM, which cooperates with the co-located Eulerian background mesh. These simulations permit accurate prediction of the dynamic evolution of damaged materials, including scenarios where fracture, fragmentation, cratering, ejecta, or spallation is present.

Augmented with a *full* stress history, this mixed-frame method can predict damage caused by tension (spall) and shear, and the method also offers several user-defined options for the treatment of fully damaged material. Specification of Johnson-Cook damage parameters is a typical modeling choice for FLIP+MPM, and validation studies show its effectiveness in fragment prediction and other failure behaviors. Two types of scenarios

where FLIP+MPM is especially useful is the modelling of high-velocity impacts and explosions.

## Antarctica Remains the Wild Card for Sea-Level Rise Estimates Through 2100

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An expansive collaborative research project, covered in the journal *Nature* this week, offers projections to the year 2100 of future sea-level rise from all sources of land ice. This project has achieved the most complete projections to date.

The work synthesizes improvements over the last decade in climate models, ice sheet and glacier models, and estimates of future greenhouse-gas emissions. More than 85 researchers from various disciplines, including a team at the Laboratory, produced sea-level rise projections based on the most recent computer models developed within the scientific community. The team also updated scenarios of future greenhouse-gas emissions.

These estimates show that limiting global warming to 1.5 degrees Celsius above pre-industrial temperatures would cut in half projected 21<sup>st</sup> century sea-level rise from land ice, relative to currently pledged emissions reductions. For example, the paper notes that, when looking at all land ice sources, the median projection of cumulative rise in sea level by the year 2100 decreases from approximately 25 centimeters to approximately 13 centimeters when emissions are limited.

Los Alamos and DOE contributed during many stages of the newly published work, such as the following:

- evaluating and selecting the most appropriate climate models to use for exploring future changes to the Antarctic region,
- developing experimental protocols and best methods to apply climate model output to drive ice sheet models, and
- conducting ice-sheet model simulations to project the future sea-level rise contribution from the Antarctic Ice Sheet.

For this paper, Laboratory simulations were performed using a combination of the Grizzly and Badger super-computers at the Laboratory, as well as National Energy Research Scientific Computing Center (Cori-KNL) high-performance computing resources.

## Artificial Intelligence Helps Solve the Most Complex Problems Beneath Our Feet

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In an article published in the *Santa Fe New Mexican*, Hari Viswanathan, a hydrogeologist in the Laboratory's Computational Earth Science group, writes about how the Laboratory is using artificial intelligence (AI) to better understand seismic behavior and earthquakes.

Viswanathan notes that AI, in this case, refers to computer algorithms that take in massive amounts of data and uncertainty and then identify patterns, learn from those patterns, and make predictions thousands of times faster than a human can.

This work is particularly helpful in the realm of geological science, where we look for patterns deep below the Earth's surface to understand Earth's processes and resources. In geology, there is a variety of unknowable possibilities, and separating one slice of information among the cacophony of natural noise is impossible for the human mind. Earthquakes are a good example because even though we can predict many of the world's natural disasters, alerting cities to an oncoming earthquake remains elusive. However, the answer may lie in AI.

To find that answer, Viswanathan and others study fault zones, which constantly tremble as one tectonic plate pushes against another, creating vibrating signals that look much like acoustic waves. Occasionally, deep underground, these plates subtly shift, causing a "slow slip" movement almost imperceptible to humans.

Leading up to each slow slip is a seemingly random jumble of these acoustic waves. For years, scientists had dismissed this as noise — useless, random data. Recently, however, Laboratory scientists applied AI to these data and discovered such data were hiding a trove of information about seismic behavior and earthquakes.

The topic of AI in the field of geological science is the focus of a virtual seminar series throughout the summer called "Machine Learning in Solid Earth Geoscience," a LANL-hosted series that typically took place in Santa Fe before the onset of the COVID-19 pandemic.



## ASC Strengthening Common Modeling Framework by Integrating Historical Pedigreed Data

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Stockpile stewardship depends on simulations validated against data collected during the nuclear test era. Because of the great diversity of diagnostics used and the need for complex calibrations or other corrections, there has been a long-standing goal of streamlining the process for incorporating the historical data in assessments.

The Advanced Simulation and Computing (ASC) Verification & Validation's Data Validation and Archiving Project is working to make this goal a reality by learning the workflow and integrating relevant data under the guidance of modelers. Recently, the cable impulse response, detector response, and pedigree for each were added to the Common Modeling Framework (CMF) for B61 core shots. These files were previously available ad hoc, but not within the CMF — until now.

This effort helped answer a high-priority request from the Air Force Nuclear Weapons Center regarding the B61-12. Working closely with designers to upload data into CMF led to a new idea for uploading historical support data — this new idea should simplify and provide pedigreed data access across multiple authorities.

## Laboratory's CNI Program Develops Computationally Inexpensive Simulation Platform to Perform Studies in 2D Design and Analysis

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A platform developed by the Laboratory's Capabilities for Nuclear Intelligence (CNI) includes relevant sources and physics models needed to conduct accurate simulations. This platform provides a new tool to assess a variety of devices, including stockpile-like devices and some of interest to the intelligence community.

Personnel within the CNI Program focus on strengthening the understanding of technical issues related to foreign nuclear weapons. CNI's mission is to develop theoretical, computational, and experimental capabilities that enable performance and safety assessments of foreign nuclear weapons by the Intelligence Community.

## NDI's Latest Release Delivers New, Enhanced Capabilities to Transport Codes

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The Nuclear Data Interface (NDI) is the preferred code and data format to deliver multigroup nuclear data to transport codes at the Laboratory. Researchers commonly use multigroup cross-sections to limit the size of tabulated nuclear data files while maintaining a high fidelity of calculated results for particular applications of interest.

The latest release, NDI-2.2.0, includes three new and major advances: (1) the inclusion of charged-particle stopping powers as part of the recent Charged Particle Transport Level 2 milestone; (2) the capability to read NDI-formatted binary multigroup neutron and photon data; and (3) the inclusion of corrected thermonuclear data, which fixes some energy balance conservation issues.

The ability of NDI to read in binary data provides a significant improvement over ASCII data formats, which were previously used for both consistency across platforms and human readability. As data needs have grown, this choice has led to lengthy input processing times, thereby hampering the ability to rapidly perform many transport calculations, as performed with the Laboratory's multigroup SN transport code PARTISN, widely used at the Laboratory to perform shielding calculations and nuclear data validation, for example. This code is also used by the nuclear reactor physics community.

Although switching to a simple binary format does not solve these problems entirely, it does provide a noticeable benefit (e.g., 2x–6x speedup). The future adoption of more efficient formats, such as HDF5 and the new nuclear data format standard GNDS (Generalized Nuclear Database Structure), should further improve the situation.

## Progress Made to Validate a New Lagrangian Code

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Advanced Simulation and Computing (ASC) developed a variant of the Verney shell collapse problem that has an analytic solution. This solution can be used to evaluate numerical methods used to simulate 3D hydrodynamics with strength.

ASC's variant of the Verney shell problem involves the collapse of a steel shell with an elastic, perfectly plastic

strength model. Two- and three-dimensional simulation results with xRAGE, the Laboratory's AMR/Eulerian hydrocode, agree for this problem and closely match both the analytic solution and a pure Lagrangian 3D simulation with FUEL, a newly developed Laboratory ALE hydrocode created for the Ristra project. The 2D xRAGE simulation results show excellent symmetry at the final time of the shell collapse.

Code-to-code comparisons using this 3D shell collapse problem enhance the understanding of modeling choices and associated uncertainties between Laboratory-developed hydrocodes.

## Quantum Machine Learning Hits a Limit

A new theorem from the field of quantum machine learning has poked a major hole in the accepted understanding associated with information scrambling.

"Our theorem implies that we are not going to be able to use quantum machine learning to learn typical random or chaotic processes, such as black holes," noted Zoe Holms, a Laboratory post-doc who coauthored a paper describing the work published in *Physical Review Letters*. "In this sense, it places a fundamental limit on the learnability of unknown processes."

Holms said that because most physically interesting processes are sufficiently simple or structured so that they do not resemble a random process, the results do not condemn quantum machine learning but rather highlight the importance of understanding its limits. In the classic Hayden-Preskill thought experiment, "Alice" attempts to destroy a secret, encoded in a quantum state, by throwing it into nature's fastest scrambler, a black hole. "Bob" and Alice are the fictitious quantum dynamic duo typically used by physicists to represent agents in a thought experiment.

In this experiment, Bob can still retrieve it using entanglement, a unique feature of quantum physics. However, the new work proves that fundamental constraints on Bob's ability to learn the particulars of a given black hole's physics means that reconstructing the information in the book is going to be very difficult or even impossible.

"You might think that this would make Alice's secret pretty safe," Holmes said, "but Hayden and Preskill argued that if Bob knows the unitary dynamics implemented by the black hole, and they also share a maximally entangled state with the black hole, it is possible

to decode Alice's secret by collecting a few additional photons emitted from the black hole. But this prompts the question, how could Bob learn the dynamics implemented by the black hole? Well, not by using quantum machine learning, according to our findings."

## Zoe Holmes Named First Mark Kac Postdoctoral Fellow in Applied Mathematics

Zoe Holmes of Information Sciences (CCS-3) was selected as the Laboratory's first Mark Kac Postdoctoral Fellow in Applied Mathematics. Named after the Polish American Mathematician, the Mark Kac Postdoctoral Fellow in Applied Mathematics will pursue cutting-edge research in DOE-relevant areas of applied mathematics.

One such fellowship is selected each year. The DOE Office of Applied Scientific Computing Research and the Center for Nonlinear Studies jointly sponsor these appointments. Appointments are for two years, with full funding provided.

### MISSION OPERATIONS

## Dina Siegel to Lead American Industrial Hygiene Association

Dina Siegel of the Occupational Health and Safety Division was recently elected vice president of the American Industrial Hygiene Association (AIHA). In this position, Siegel will lead one of the nation's premier organizations that protects workers.

Having joined AIHA in 1983, Siegel served on the association's board since 2015 and has previously held positions as director-at-large and secretary.

AIHA representatives noted that Siegel's service has included numerous association volunteer groups and committees, including those involving biosafety and environmental microbiology, exposure assessment strategies, nanomaterials, and women in industrial hygiene.

Headquartered in Fairfax, Virginia, AIHA is an association for scientists and professionals committed to preserving and ensuring occupational health and safety in the workplace and in the community.

## Dragonfly Mission Heat Sources Successfully Packaged and Ready for Idaho National Laboratory

During the last week of April 2021, eight general-purpose heat sources (GPHS) were packaged and prepared for future shipment from the Laboratory to Idaho National Laboratory (INL). These are the first GPHS to be prepared for INL since 2018, when clads in support of Mars 2020 were last sent. The shipment of these eight clads supports NASA's 2027 Dragonfly mission to Saturn's moon, Titan.

The Laboratory has been tasked with manufacturing 32 GPHS clads for Dragonfly, and this shipment is the culmination of three years of effort to prepare the project. GPHS clads are radioactive sealed sources that generate heat through alpha decay of plutonium-238. To transfer GPHS clads, special containment vessels permitted for transfer between DOE sites must be used. Sealing these vessels is no simple task — it involves special nuclear materials (SNM) operations, such as welding, leak testing, and radiography to ensure safe transfer of the heat sources.

This effort required extensive integration of teams at the plutonium facility to design and procure new equipment, install equipment, qualify the operation, and transition to nuclear operations. Because of the thermal power degradation of the heat sources, a timely transfer after they are manufactured is crucial, and this team expedited the effort to provide materials ready to ship. This achievement reinforces LANL's ability to meet current and future radioisotope power systems program milestones and missions.

## Finance Division Analysts Advance in the FFMCP

In January 2021, 32 financial analysts from the Laboratory's Finance Division graduated from the Federal Financial Management Associate's Certificate Program (FFMCEP). The FFMCEP included courses in Appropriations Law; Budget Analyst's Essential Guide to Formulation, Justification, and Execution; and Budgeting and Accounting: Making the Connection. The program advanced attendees' practical knowledge in the federal fiscal and budgeting environment and will be used to improve functional skills to address critical matters, such as allowable costs, U.S. General Ledger, and multi-year budget development processes.

Twenty-nine of the Finance Division's FFMCP graduates continued into the Federal Financial Management Master's Certificate Program. The master's program builds on the core courses with five additional advanced classes: Budget Execution; Budget Formulation; Excel Data Analysis; Capital Assets using Office of Management and Budget Criteria; and a Defense Planning, Programming, Budgeting, and Execution workshop. The master's cohort will graduate in June 2021.

## How the Laboratory Made LANSCE Maintenance Safer

Switchgear maintenance work at the Los Alamos Neutron Science Center (LANSCE) is required every six years at the TA-53 electrical substation. The last time such work was done (2015), a substation electrician was seriously injured in an arc flash event.

During recent switchgear maintenance, crucial safety measures were evident and the work was completed without any issues. Bret Simpkins, Associate Laboratory Director for Facilities and Operations, visited the site while the work was performed to witness the safety measures first hand.

"We've changed the way we approached this work. Demonstrating learning organization behavior," Simpkins said. "We re-evaluated the hazards and chose to remove the primary hazard by de-energizing the entire facility."

As part of the planning, Toni Taylor, Associate Laboratory Director for Physical Sciences, and Raeanna Sharp-Geiger, Physical Sciences' Chief Operating Officer, met with leaders in the Utilities and Infrastructure Division (UI), Maintenance Site Services Division (MSS), and the LANSCE Facility Operations Directorate (FOD) to discuss a work plan and review the teams' readiness to conduct the activity.

David Griego (LOG-CS), the foreman over the medium-voltage crew, participated in the meetings. "Those meetings meant we could diagnose issues that could come up before the work was performed," Griego said.

The current work plan greatly improved how work is executed. This year, work was done during a four-day complete outage to alleviate pressure on workers, compared to a two-day partial outage during work conducted in 2015.

## Information & Technology Adds Zoom for Government to LANL's Remote Collaboration Tools

The Laboratory's Information & Technology organization recently added Zoom for Government (ZoomGov) to its approved remote collaboration capabilities. ZoomGov is now available to customers LANL-wide. New guidance, including rules of use, has been posted to the Laboratory's internal Telework Hub website.

ZoomGov is available for open-source discussions only — thus, classified and Controlled Unclassified Information (CUI) conversations are prohibited. With ZoomGov available, the Laboratory now has the added benefit of collaborating with outside institutions.

## Laboratory Exceeds Government Benchmark for Information-Technology Accessibility

The Laboratory's external website has achieved 90.7% overall website compliance with Section 508 of the Rehabilitations Act, which President Clinton signed into law in 1998. This law stipulates that all federal agencies must make their electronic and information technology accessible to people with disabilities. The current benchmark is 74.2%.

The Institutional Web Team has been working behind the scenes to ensure that all templates and web code results in accessible webpages. The Web Team has also been carrying out the following efforts:

- Monitoring the external website daily for any accessibility errors, which are corrected as soon as possible.
- Conducting classes four times a year (in addition to individual sessions) to train users in maintaining accessible webpages and how to create accessible PDFs and accessible documents for download.
- Maintaining a detailed accessibility webpage used to educate Laboratory employees on Section 508 and accessibility.
- Maintaining a detailed how-to webpage to assist document authors in creating accessible PDFs.
- Running an information campaign that covers accessibility, with the first story, titled "Web inclusion for all: how you can help," published on

May 20, 2021. This campaign will run different weekly stories through July 19, 2021.

## Laboratory Unveils Employee Training Building in Downtown Los Alamos

Beginning May 17, 2021, a group of employees will move into a 49,000-square-foot facility in downtown Los Alamos. Once COVID-19 restrictions are lifted and the first level of the building remodel is complete, the new Employee Training Academy will accommodate more than 120 employees and a variety of hands-on training and qualification spaces.

With Los Alamos County in Turquoise (a designation that means low-level risk of COVID-19) and Governor Lujan-Grisham planning for New Mexico to re-open in late June 2021, Los Alamos residents are wondering how the Laboratory's presence downtown will look post-pandemic. The Laboratory will continue to lease post-COVID the former Community Partnerships Office on Central Avenue, which will house personnel from Communications Arts and Services. Central Park Square has undergone a significant remodel and has been transformed into a high-density telecommuting hub for the Laboratory's business services organizations. The Bradbury Science Museum, 1350 Central Avenue, is in the process of revitalizing exhibits and remodeling office space in preparation for a potential early summer reopening.

The building at 195 East Road is only partially remodeled and is expected to be completely open in winter 2021.

## Materials Science Lab's Bus Ducts Replaced, Ensuring Reliable Power for MST and SIGMA

Main electrical power feeds to the Materials Science Laboratory (MSL) were recently replaced, thanks to the dedication and commitment of the staff in the Science and Technology Operations (STO) Division. To get the job done, these staff members worked during consecutive weekends in April.

The main electrical power feeds, called bus ducts, at MSL (TA-03-1698) support the Materials Science and Technology (MST) and SIGMA research divisions. Replacing the bus ducts ensures reliable power to meet MST's and SIGMA's material science missions and continued safe operations.



STO worked with Eaton Corp. to replace the electrical bus ducts, which had to be manufactured. Because of the pandemic, manufacturing was paused last year, and the building was placed on temporary power. On April 9–11, the first of two bus ducts was installed. MSL facility manager Ed Crespín's perseverance helped ensure MSL has a safe and redundant power supply.

Working multiple weekends in April, STO's Engineering and Maintenance and Operations teams installed the second electrical bus duct. The work was officially completed on April 30, 2021.

## New CONDOR Repository Boosts Ability to Locate, Retrieve Critical Weapons Documents

A document management system, the Weapons Mission System CONTROLled DOCUMENT Repository (WMS-CONDOR) stores and archives classified documents for the Associate Laboratory Directorate for Weapons Production (ALDWP). Collaborating with Training and Mission Services (ORI-1), the Weapons Research Services–Weapons Mission Technology (WRS-WMT) team has built a new CONDOR repository on the classified system using the OpenText Documentum platform – a Commercial Off-The-Shelf (COTS) document management software. Using the metadata and full-text search capability, the system increases the ability to locate and retrieve critical documents by key personnel.

WMS-CONDOR's initial use is to store and archive the completed classified documents created by TA55 in support of the 30 pits per year initiative. Documents are created by Ops Support Specialist (OSS) contributors and are searched and viewed by Engineering, Operations, as well as other technical staff who have permission to access the documents.

Documents in the repository contain nine different document types or classes: Correspondence, Engineering, Procedural, Environmental Mgt-Waste, External Source Content, Records-Various, Safety, Submittals, and Training documents. Each Document Class has its own lifecycle to support documents permission and access control at each stage of its lifecycle. For example, In-Progress, Approved, Effective, Issued for Use, and Archived.

All documents are tightly controlled with a lifecycle security model to ensure that only those users with proper access can view the documents and metadata

at each stage of its lifecycle. All activity by OSS contributors and consumer users is also audited by the system and stored in the internal audit log for traceability.

## NSRC Launches Relics Podcast to Highlight Laboratory History, Weapons Legacy

The Laboratory's National Security Research Center (NSRC) recently debuted its new podcast, Relics, with three, 10-minute episodes. This strategic communications product was developed to heighten awareness of the nascent NSRC as a major research library. It was also designed to educate audiences about national security. The NSRC, the Laboratory's classified library, also houses unclassified historic materials that serve the entire Weapons Program and Global Security.

Each episode of Relics spotlights one significant item with mini-lessons about Los Alamos history. The inaugural episode is the story of J. Robert Oppenheimer and his wartime director's chair. More episodes of Relics will be released during the fall of 2021.

## Reducing Waste Inventory is Freeing Up Space

Recent transuranic waste shipments to the Radioassay and Nondestructive Testing (RANT) facility continue to support production efforts at the Laboratory. In April 2021, loading shipments of waste from Area G resumed. Significant progress was made in inventory reduction at Area G. Deinventory efforts at Area G free up contingency space for Triad National Security, LLC, waste during pauses or outages at the Waste Isolation Pilot Plant (WIPP) or to store oversized items. Meanwhile, back at TA-55, storage use continues to hold at less than 50%, and is currently 37%, enabling space to support production work.

## Two Major Electrical-Infrastructure Projects Wrap Up, Improving Reliability

Two major projects to help improve the operation and reliability of the Laboratory's electrical infrastructure wrapped up in the final week of April 2021. First, the remote terminal unit (RTU) at TA-53 was replaced. An RTU enables electrical operators to monitor and control medium- and high-voltage electrical gear. This RTU is for the 13.8-kilovolt switchgear at TA-53, which provides

power to the beam line at the Los Alamos Neutron Science Center. The RTU had been located in a vault below the switchgear, which was prone to flooding that caused loss of some signals and control.

Utilities and Infrastructure teams installed a new RTU in the main switchgear building and performed wiring and commissioning testing. The cutover restored functionality that had been lost and improved site safety, even as remote operations mitigate the need for personnel to stand in front of the equipment while switching operations occur.

Second, the Laboratory's onsite 29-megawatt combustion gas turbine generator had its power system stabilizer (PSS) tuned. The PSS dampens electro-mechanical oscillations in the generator by tuning control loops within the generator exciter, thus helping to improve generator performance during grid disturbances, which improves dynamic grid stability. The tuning will help the Laboratory continue to provide high-quality service to valuable customers and their missions.

## UI Uses LiDAR Equipment to Quantify Cell Tower's "Sunflower Effect" for Verizon

Some of the greatest strengths of the Laboratory's Utilities and Infrastructure (UI) Division consist of teamwork and ability to bring together different disciplines and capabilities to solve challenging problems. A few years ago, the Laboratory asked UI to lead an effort for personnel to install cell-phone infrastructure that improved onsite cellular communications. The teams assigned to this effort successfully completed the project this year. Since then, the Laboratory and NNSA have worked with Verizon to complete negotiations to install Verizon equipment on the cell towers.

During a walk down with Verizon, the collaborators noted that the tower at TA-15 appeared to be leaning a bit. The tower's manufacturer called this leaning the "sunflower effect," where heating of the tower through solar irradiation caused a slight lean. Using Light Detection and Ranging (LiDAR) equipment, Harold Salazar of Facility System Engineering Utilities and Infrastructure (ES-IIT) quantified the tower movement over the course of a day. The scans, performed early in the morning and throughout the day, measure the movement at the top of the pole as the Sun's direction changed and as ambient temperature increased. The LiDAR-collected data will help Verizon personnel evaluate the safety of the tower installation.

## Women Engineer Magazine Names the Laboratory a "Top 20 Government Employer"

The Laboratory is one of 20 government agencies in the U.S. to make the 30<sup>th</sup> Annual "Top 20 Government Employers" list by *Woman Engineer* magazine. The magazine has graded the Laboratory among the highest-ranking DOE national laboratories since 2017. This year, the Laboratory is the highest-ranked DOE national laboratory on the list, nabbing the tenth spot.

The readers of *Woman Engineer* magazine selected the top government agencies in the country for which they would most like to work or whom they believe would provide a positive working environment for women engineers. This list is the result of an annual reader survey mailed to randomly selected readers of *Woman Engineer* magazine.

### COMMUNITY RELATIONS

## Bikes Donated to Nonprofit Program

Laboratory employees answered the call to help children receive free bikes. New Mexico nonprofit program Free Bikes 4 Kidz had a goal to collect 500 used bikes by April 2021, but thanks partly to the Laboratory, the organization received more than twice that amount. With collection sites in Taos, Los Alamos, Santa Fe, and Albuquerque, this effort collected 150 in Los Alamos alone, after a call went out to Laboratory employees. The Lab's Community Partnerships Office worked with the Kiwanis Club to coordinate these collections.

Altogether 1,250 bikes have been donated. Lab employees also donated \$1,550, which will enable volunteers to make necessary repairs to the bikes and thus help ensure every two-wheeler is safe to operate. Working with school programs, churches, and advocacy groups ensures bikes are distributed to children in need.

## Capital Projects Teams with Local College to Present Project Management Certificate Opportunity

Given the many current and future job opportunities available in Project Management and Project Controls at the Laboratory, the leadership team in Capital Proj-

ects is working with the business school at Northern New Mexico College to encourage Laboratory employees to explore such a certificate program. Meant for people with some background in business, engineering, or project management, the certificate program takes students through five upper-level classes throughout one semester. At the end of the program, students will have completed 15 credit hours of coursework, will have earned a certificate in project management, and will be prepared to take the Project Management Professional Exam, which leads to certification as a project manager.

For students who want to continue their studies in the field, Northern New Mexico College offers a Bachelor's Degree in Project Management. All courses that students complete for the certificate will be credited toward their bachelor's program course of study. All classes are online and asynchronous. Tuition reimbursement may also be available through the Laboratory's Education Assistance program.

## Craft Employees Recognized for Contributions during COVID-19 Pandemic

When the COVID-19 pandemic struck last spring, the majority of the Laboratory's 13,000 employees — with management's support — quickly switched to teleworking. However, a critical contingent of employees remained onsite to ensure mission-essential functions were kept going.

Among these brave, dedicated employees were craft team members from the Laboratory's Capital Projects and Facilities and Operation directorates. While COVID-19 raged around the world, these mission-essential employees stayed the course to make sure the Laboratory could fulfill its national security mission.

While driving infrastructure improvements, craft team members continue to put safety and security first. Many crafts were among the first employees to receive vaccinations, and they continue to lead in adhering to COVID-19 safety protocols that have become the norm over the past year.

Craft efforts and contributions have not gone unnoticed. For example, both the New Mexico State House of Representatives and the New Mexico State Senate proclaimed March 4, 2021, as Los Alamos National Laboratory Union Craft Workers Day. State Representative Christine Chandler, and Senator Leo Jaramillo (Associ-

ate Laboratory Directorate for Facilities & Operations) recognized the efforts of these employees by sponsoring the proclamation and sharing the good news among their peers.

As more Laboratory employees line up to receive the COVID-19 vaccine, we can be sure that craft team members will continue to be front and center in the fight against this disease.

## Laboratory Director Mason Answers Community Questions on Pit Mission, Science, and New Leases

In his first-ever community meeting open to all New Mexico residents, Laboratory Director Thom Mason answered questions on subjects ranging from the future of the Laboratory's footprint in Los Alamos to wildfire prevention. As part of the 90-minute session held live on Webex, Mason also gave a short presentation that covered news about the National Nuclear Security Administration's early milestone decision on the pit mission and advances in science.

Mason held the meeting to give community members a chance to learn more about the Laboratory's work. Altogether, he and moderator Joe Gonzales of the Laboratory's Public Affairs group covered more than two dozen topics raised by New Mexicans from as far away as Silver City, including the following:

- Balancing the Laboratory's role as a nuclear security site and a scientific campus.
- Addressing Triad National Security, LLC's (Triad's), environmental responsibilities at LANL.
- Describing the roles and responsibilities between the National Nuclear Security Administration, Triad, DOE-Environmental Management, and N3B.
- Addressing the future of telework at the Laboratory.
- Venting Flanged Tritium Waste Containers.
- Articulating expectations about renewable energy opportunities under the new DOE secretary.
- Addressing housing needs to meet the Laboratory's expected growth.

## LANL Foundation Awards \$753,500 to 106 Scholarship Recipients

In collaboration with the Los Alamos Employees' Scholarship Fund, the LANL Foundation has announced its recipients for the 2021 Four-Year Scholarship. These scholarships award a grand total of \$753,500 to 106 outstanding northern New Mexico students.

Top-level \$20,000 Gold Scholarships went to three graduating seniors: (1) Adriana Cordova of Cuba High School, (2) Britney Hsu of Taos High School, and (3) William McTeigue Vasquez of Los Alamos High School. Cordova plans to pursue a career as a wildlife biologist, whereas Hsu will attend Rice University to learn how to treat neurodegenerative diseases and improve health-care in her community. McTeigue Vasquez will major in biology at the Massachusetts Institute of Technology and plans to attend medical school to become a cardiac surgeon.

Jeraldine De Los Santos of Capital High School received the \$20,000 Sheila Morris Luna Memorial Scholarship, designated for an outstanding female student pursuing a degree in a STEM field at an in-state college or university.

Scholarship amounts range from \$1,000 to \$20,000, with certain awards focused on students pursuing degrees in education, nursing, health care, engineering, business, STEM, or the arts. LANL employees in large part fund these scholarships. The LANL Foundation has formed partnerships with Triad National Security, LLC; Anchorum St. Vincent/Christus St. Vincent; and private donors to provide scholarships and support services for students from northern New Mexico.

## Nonprofit Partners Brief Triad Board Members on Impact of Community Commitment Plan

On May 20, 2021, executive directors and board members from the Laboratory's three principal nonprofit partners briefed Triad Board members. These briefings covered the impact of Community Commitment Plan investments by Triad National Security, LLC (Triad), over the last year.

Triad Board members Gary Falle and Scott Sudduth met with representatives from the Regional Development Corporation (economic diversity), LANL Foundation (STEM education, scholarships and teacher development), and the United Way of Northern New

Mexico (nonprofit capacity building and philanthropy) at a virtual meeting. Triad's Community Commitment Plan for 2021 invests a total of \$2.5 million to support nonprofits in northern New Mexico nonprofits.

The Laboratory's Community Partnerships Office also gave an update on how the Community Commitment Plan meshes with the broader community relations activity in the fourth area of the Lab Agenda.

## Nuclear Criticality Safety Team Created Student Pipeline with UNM

The Nuclear Criticality Safety Division (NCS) has created an educational pipeline with the University of New Mexico (UNM) after introducing the program at four other universities. The program builds awareness of nuclear criticality safety as a profession, addresses staffing shortages in the NNSA complex, and provides mentoring and teaching opportunities for the Laboratory's current criticality safety engineers.

This UNM pipeline program, funded by the DOE Nuclear Criticality Safety Program, will provide academic coursework and research opportunities for upper-level engineering students with teaching and mentoring collaborations provided by NCS staff. The first three years of the university pipeline program have been very successful. More than 80 upper level-classmen have been introduced to nuclear criticality safety at four universities: New Mexico State University in 2017, Idaho State University in 2018, Texas A&M University (2017 to present), and University of California – Berkeley (2018 to present).

More than 20 of these students have participated in summer internships, where they developed criticality safety evaluation documents (CSEDs) and other technical documents with a qualified co-author. Some students continued working for the Laboratory part-time through the following year. Seven summer interns were offered full-time positions; two of whom have reached full qualification.

In Fall 2021, a team of LANL criticality safety engineers will participate in discussion panels and provide guidance to UNM students. A team consisting of Norann Nell Calhoun, Kaelin Glover, Mandy Bowles-Tomaszewski, Ryan Kamm, and Kristy Yancey Spencer will also present material on their experiences and philosophies pertinent to practicing nuclear criticality safety, complementing Dr. Christopher Perfetti's lectures.



## Partners Selected for Community Data Sprint, Pairing Laboratory Data Scientists with Regional Organizations

A new Laboratory program has paired local nonprofit and social-good organizations with Laboratory data scientists to solve data-related problems that benefit northern New Mexico.

Eleven community organizations applied to take part in the Community Data Sprint, and the two chosen partners were the nonprofit Rocky Mountain Youth Corps, as well as a joint project from Northern New Mexico College and Santa Fe Community College. There is no charge for organizations to participate in the project.

[Rocky Mountain Youth Corps](#) provides workforce development training and educational programs to young people in New Mexico. The organization is seeking to understand its performance in gender diversity, effective mentorship, and general impact.

The colleges' project focuses on student retention rates, risk factors, and signs of academic and professional success.

Sponsored by Laboratory's Information Science & Technology Institute and the Community Partnerships Office, Laboratory computer scientists (with experience in applied machine learning, data science, and agile code development) will spend a week over the summer working with the partners through analyzing their data and helping to draw conclusions from it.

## Two-Day Hiring Event a Huge Success for Capital Projects

The need for additional employees to join the Laboratory's Capital Projects Directorate continues to be a top priority. The COVID-19 pandemic created an opportunity for the Human Resources team to shift to digital interviewing, hiring, and on-boarding practices. This shift enabled Human Resources to keep pace with the burgeoning need to hire employees while maintaining the Laboratory's maximum telework posture.

In April 2021, hiring teams from two directorates (Capital Projects and Weapons) introduced two-day, online hiring events. The two hiring teams shared an introductory presentation to all candidates on the first day of the event, as well as invitation templates and the format for the WebEx meeting. In all, 30 Capital

Projects team members participated in the event, with additional results summarized as follows:

- two-day event with four interview teams,
- three-to-five managers per team,
- 40 candidates interviewed,
- 20 job offers accepted,
- 14 new hires in Project Management, and
- six new hires in Project Controls.

Because the event proved so successful, and because the need to hire additional qualified personnel continues, the Capital Projects Human Resources team plans to host more online hiring events each month for as long as it makes sense to do so. This month's event occurred May 25–26, 2021.

## Winner Announced for a Safety Poster Driver-Safety Campaign Contest

The Laboratory and N3B's Commuter Safety Task Force announced that Valentina Krylowicz, a Los Alamos fourth grader, has won the 2021 driver-safety-campaign poster competition.

Krylowicz's mother works as a contract assurance specialist in the Institutional Quality & Performance Assurance Division, and her father works as an accountant in the Safeguards–Nuclear Material Control and Accountability Division. Both parents have been actively involved with the Laboratory's Worker Safety & Security Team (WESST), and they have a strong commitment to safety and security.

The poster submissions focused on positively influencing driving to and from Los Alamos. The posters addressed bad behaviors, such as speeding, aggressive driving, rudeness, tailgating, cutting off drivers, and cell phone usage while on the road.

## SELECTED MEDIA COVERAGE

[Elements of LANL Plan to Produce Pits Approved](#)  
*Albuquerque Journal* (4/28)

The National Nuclear Security Administration announced Wednesday that it has approved the project definition phase and conceptual design of the Los Alamos Plutonium Pit Production Project, paving the way for the lab to ramp up pit production.

### [Using Cosmic-Ray Neutron Bursts to Understand Gamma-Ray Bursts from Lightning](#)

*Science Daily (4/28)*

Analysis of data from a lightning mapper and a small, hand-held radiation detector has unexpectedly shed light on what a gamma-ray burst from lightning might look like — by observing neutrons generated from soil by very large cosmic-ray showers.

### [How Climate Change Moved Earth's Axis](#)

*Mashable (4/29)*

"There's definitely global winners and losers due to these changes," explained Matthew Hoffman, a glaciologist and computer scientist at Los Alamos National Laboratory. "Some cities will be hit harder if West Antarctica collapses relative to other cities," he said, referencing the accelerated melting and potential collapse of colossal Antarctic glaciers.

### [LANL Director Fields Questions about Nuclear Weapons, Growth](#)

*Santa Fe New Mexican (4/29)*

Los Alamos National Laboratory's primary mission will remain national security into the foreseeable future — with the nuclear weapons program as the mainstay — even as the lab branches further into medical science, ecology, and space exploration, Thom Mason, the lab's director, said during an online forum with residents Thursday.

### [Seven Graduates of DOE Office of Science Graduate Student Research Program Headed to LANL](#)

*Los Alamos Reporter (4/29)*

The Department of Energy's (DOE's) Office of Science has selected 78 graduate students representing 26 states for the Office of Science Graduate Student Research (SCGSR) program's 2020 Solicitation 2 cycle. Seven of those students will be joining Los Alamos National Laboratory.

### [LANL Interim Measure to Control Chromium Plume Reaches Full Operation](#)

*Los Alamos Reporter (5/4)*

This week's update newsletter from the Department of Energy's Office of Environmental Management announced that an interim measure to control migration of a groundwater plume containing hexavalent chromium beneath Los Alamos National Laboratory (LANL) is now fully operational. The milestone marks a major achievement for Newport News Nuclear BWXT Los Alamos (N3B) in its efforts to shrink the plume and protect area water quality.

### [LANL Data Scientists Provide Assistance to Local Organizations](#)

*Los Alamos Reporter (5/5)*

A new Los Alamos National Laboratory program is pairing local nonprofit and social good organizations with LANL data scientists to solve data-related problems to benefit Northern New Mexico.

### [Los Alamos Invests in Workforce of the Future](#)

*Taos News (5/5)*

Los Alamos National Laboratory gave a special online presentation to the Taos Municipal Schools District at its school board meeting Wednesday, April 21. LANL discussed its recent efforts in building-trades classes, Taos High School students who received LANL Foundation scholarships and the Lab's creation of an online STEAM learning center.

### [NNSA Issues Early Milestone Decision on Los Alamos Pit Production](#)

*Nuclear Security & Deterrence Monitor (5/5)*

The National Nuclear Security Administration Wednesday (May 5, 2021) said it has approved Critical Decision 1, or the project definition phase, for making 30 pits per year at Los Alamos for national security needs. The price tag for the Los Alamos Plutonium Pit Production Project could approach about \$4 billion, the NNSA said.

### [This Old Programming Language is Suddenly Hot Again. But Its Future is Still Far from Certain](#)

*ZD Net (5/5)*

Ondřej Certik, a scientist at the US Department of Energy's Los Alamos National Laboratory, is on a mission to resurrect Fortran through two key projects.

### [Antarctica Remains the Wild Card for Sea-Level Rise Estimates Through 2100](#)

*Environmental News Network (5/6)*

A massive collaborative research project covered in the journal *Nature* this week offers projections to the year 2100 of future sea-level rise from all sources of land ice, offering the most complete projections created to date.

### [LANL Announces Lease of Building on East Road in Downtown Los Alamos for Employee Training Center](#)

*Los Alamos Reporter (5/6)*

Los Alamos National Laboratory announced Thursday the signing of a five-year lease for a building at 195 East Road in Los Alamos. One floor of the 49,000-square facility has been completely remodeled and appears to be ready to go. Also reported in the [Los Alamos Daily Post](#).

### [LANL Looking for 100,000 Square Feet to Lease](#)

*Santa Fe New Mexican (5/7)*

Los Alamos National Laboratory is seeking to lease as much as 100,000 square feet for another off-site facility to house a growing workforce its main campus can no longer accommodate. The lab issued a notice requesting “light laboratory” space within a 50-mile radius of its campus.

### [UNM-Los Alamos Student Althea Denlinger Receives Danny Nichols Memorial Scholarship](#)

*Los Alamos Daily Post (5/10)*

After moving to Los Alamos from Pittsburgh, Denlinger worked at Hot Rocks Café and made the effort to talk with the computer scientists that came in as customers. She got to know a few, asked them questions, and was inspired to hear about the work that they were doing at Los Alamos National Laboratory (LANL). Now she has a scholarship and is part of a project in T-Division.

### [DOE Selects Four Projects to Move Co-Optimized Biofuels and Combustion Engines Closer to Market](#)

*Green Car Congress (5/11)*

The US Department of Energy (DOE) [selected](#) four projects totaling \$1 million to conduct advanced applied research and development concerning the interaction between promising biofuels and combustion engines. . .The Coordinating Research Council will work with Pacific Northwest National Laboratory (PNNL) and Los Alamos National Laboratory (LANL) to develop an isotope ratio mass spectrometry method as a cost-effective means to identify renewable content in co-processed biomass- and fossil-derived fuels.

### [Forget Herd Immunity! Winter COVID Surges Will Bring Lockdowns, Travel Bans, Crammed ICUs](#)

*Newsweek—Fred Guterl (5/11)*

The important question is, which (variants) should we worry about? Answering that question falls in part to Bette Korber, a computational biologist at Los Alamos National Laboratories in New Mexico.

### [LANL Scientists Explain Why Sounds are Different on Mars](#)

*KRQE TV (5/11)*

What would a person’s voice sound like on another planet? Scientists at Los Alamos National Laboratory recently got to find out.

### [New Round of DOE Funding Looks to Commercialize Biofuel-Combustion Engines](#)

*NGT News (5/12)*

The U.S. Department of Energy has selected four projects totaling \$1 million to conduct research and development concerning the interaction between biofuels

and combustion engines. The projects will leverage a range of National Laboratory capabilities as part of the Co-Optimization of Fuels & Engines (Co-Optima) initiative and aim to help bring these fuel-engine combinations closer to commercial adoption.

### [Quantum Machine Learning Hits a Limit, LANL Research Shows](#)

*HPC wire (5/12)*

A new theorem from the field of quantum machine learning has poked a major hole in the accepted understanding about information scrambling.

### [Protecting Powerlines and Pipelines: the Quantum Solution](#)

*Forbes (5/12)*

Quantum-based cryptography can offer tamper-proof protections for these protocols. Scientists at both at Oak Ridge Laboratories and Los Alamos have been working on quantum key distribution (QKD) capabilities to secure the energy sector.

### [AI And Covid’s Symbiotic Relationship May Make For Tech’s Trojan Horse](#)

*Verdict (5/14)*

Scientists from the US’ Los Alamos National Laboratory focused on four such theories spreading like wildfire on Twitter. Using an AI tool, more than 1.8 million anonymised tweets containing Covid-19 keywords were analysed then categorised as misinformation if of that bent, and matched to a particular theory.

### [Historic ‘#IfThenSheCan — The Exhibit’ Featuring Woman In Stem From New Mexico](#)

*Los Alamos Daily Post (5/15)*

The Exhibit celebrates the contributions of more than 120 AAAS IF/THEN® Ambassadors, including microbiologist Dr. Harshini Mukundan, a team leader at Los Alamos National Laboratory. She designs universal diagnostics to rapidly identify all infections.

### [New Pre-Clinical Model Could Hold the Key to Better HIV Treatments](#)

*Los Alamos Daily Post (5/16)*

A team led by researchers at Weill Cornell Medicine and Children’s National Hospital has developed a unique pre-clinical model that enables the study of long-term HIV infection, co-first authors of the study [include] Christiaan van Dorp of Los Alamos National Laboratory.

### [A Newfound Quasicrystal Formed in the First Atomic Bomb Test](#)

*Science News—Emily Conover (5/17)*

The newly discovered quasicrystal from the New Mexico test site is the oldest one known that was made by

humans. Trinitite takes its moniker from the nuclear test, named Trinity, in which the material was created in abundance. Also covered by [KRQE-TV](#), [New Atlas](#), [Daily Mail](#), [Futurism](#), and others.

#### **[Are We Doing Enough to Protect Earth from Asteroids?](#)**

*Scientific American—Sarah Scoles (5/20)*

At Los Alamos National Laboratory, Cathy Plesko does asteroid mitigation research. She got into planetary defense by studying impact craters on Mars using computer models.

#### **[Study Plucks Rare Quasicrystal from Wreckage of First Atomic Bomb Test](#)**

*Smithsonian Magazine (5/21)*

In a statement, Terry C. Wallace, director emeritus of Los Alamos National Laboratory and co-author of the paper, says that quasicrystals might one day be able to be used to piece together information about old nuclear tests.

#### **[Shining a Light Against Hackers](#)**

*Albuquerque Journal (5/23)*

One of the issues Ray Newell thought he might face in describing his current project as a physicist at Los Alamos National Laboratory was to get people interested in it. Then, hackers gained control of the Colonial Pipeline's operating computers and, all of a sudden, Newell's project gained very real-world emphasis.

#### **[New Mexico's Oil and gas Regions Could Become Leaders in Hydrogen Power, Congresspeople Say](#)**

*Carlsbad Current Argus—Adrian Hedden(5/24)*

As the federal government sought to shift toward less-carbon-intense forms of energy, New Mexico's Democrat congresspeople appealed to the U.S. Department of Energy to focus efforts to develop hydrogen power in their state...New Mexico's multiple national research laboratories like Los Alamos and Sandia national labs and its renewable energy resources in the wind and solar sectors could make it an ideal location for the development of hydrogen power, the letter read.

#### **[LANL Experiencing Unprecedented Growth, Beierschmitt Tells Council: Budget at \\$3.7 Billion, Increase of \\$1 Billion Since 2018](#)**

*Los Alamos Reporter—Maire O'Neill (5/24)*

After waiting since late 2018, it appears that the Los Alamos County Council may soon be able to review the Los Alamos National Laboratory Master Site Plan. LANL Deputy Chief of Operations Kelly Beierschmitt told Councilor during their May 18 work session that when

he met with them in 2018, he predicted unprecedented growth which has been realized.

#### **[Podcast: Where Did Mars's Water Go?](#)**

*Chemical and Engineering News—Sam Lemonick, Terri Jansen (5/25)*

Roger Wiens: Percival Lowell and Giovanni Schiaparelli were advocating for the idea that there were canals on Mars, that there were sentient beings that were transporting water from one place on Mars to another in what they thought might be a drying-out planet at that time.